

R E M A R K S

Claims 1-21 are now in this Application, and are presented for the Examiner's consideration.

Additional Claim Fee

Since there are now a total of 21 total claims and two independent claims, the Commissioner is authorized to charge the additional fee of \$9.00 for one total claim in excess of twenty to Deposit Account No. 07-1524.

Prior Art Rejections

In the first place, the Examiner does not mention at all claims 13 and 19, which feature a solid cylindrical roll which supports an inner surface of the hollow body with clearance to limit elastic deformation of an outer cross section of the hollow body. It is submitted that this feature is not anticipated by or made obvious from the cited prior art.

Claims 1, 5, 9, 10, 16 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,887,155 to Bertalot.

Bertalot does not disclose hollow elasticity bodies. It is even doubted that the rollers 18 and 20 are hollow at all. Bertalot describes that the rollers are held for free rotation in a frame. See column 2, lines 30 to 35. The circular structure which can be seen at the front of the rollers (Fig. 4) is

probably just a depression serving to hold the rollers in the frame. In other words, if the rollers were hollow, they could not be rotatably held in the frame, as described.

As for the elasticity, Bertalot describes the use of cup springs 27 and 28 to urge races 25 and 26, on which the rollers 18 and 20 run, to the intermediate section 2. See column 2, lines 43 to 48, and Fig. 3. A similar construction connects the intermediate section 2 to the inner section 3. See column 2, line 65 to column 3, line 3. The pressure of the cup springs contributes to maintaining the section 2 in a backlash-free connection to the section 1. See column 2, lines 50 to 52, and the same applies to the connection of the section 2 to the section 3. The cup springs are needed, just because the rollers 18 and 20 are not elastic.

In contrast, the present invention features roll barrels constructed as hollow elasticity bodies. Because they are elastically deformable, the roll barrels themselves adapt to the clearance between the flattening of the internal element and the flattening of the external element. The extra resilient means or cup springs of Bertalot are therefore not needed, and can be dispensed with.

Although it is submitted that the language in claim 1 of the roll barrels constructed as hollow elasticity bodies provides this distinction, claim 1 has been amended to more positively recite this elasticity in that the roll barrels are elastically deformable.

As discussed above, the rollers of Bertalot are not hollow, and therefore, the limitations of claim 5 that the hollow bodies are hollow cylinders, provides a further distinction, and is in conformance with the limitation that the roll bodies are elastically deformable, contrary to Bertalot.

It should be noted that the feature of claims 10 and 18 that the cage which holds the hollow bodies and which fills a space between the internal element and the external element with little clearance and forms a boundary for deformation of an external cross section of the hollow bodies, is not disclosed or even remotely suggested by Bertalot, and would not be obvious from Bertalot. This limitation corresponds to one-piece plastic cage 20 for which there is no corresponding element in Bertalot, and in fact, there need not be any such corresponding element.

Accordingly, it is respectfully submitted that the rejection of claims 1, 5, 9, 10, 16 and 18 under 35 U.S.C. §102(b), has been overcome.

Claims 11 and 12 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of U.S. Patent No. 5,345,679 to Lennon et al.

The remarks made above in regard to Bertalot are incorporated herein.

Lennon was merely cited for disclosing a cage 34 for bearings 32 made from a plastic sleeve blank provided with flexible cross members 60. However, Lennon fails to cure the

aforementioned deficiencies of Bertalot. The steel bearings 32 are certainly not elastically deformable.

It will be appreciated that the limitations of claim 11 of the flexible cross members relates to the elastically deformable roll barrels of claim 1. Thus, since Bertalot fails to disclose elastically deformable rollers, there would be no logical reason to use flexible cross members, as taught by Lennon et al, in Bertalot.

Accordingly, it is respectfully submitted that the rejection of claims 11 and 12 under 35 U.S.C. §103(a), has been overcome.

Claims 2-4, 14, 15 and 17 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of British Patent No. 530,342.

The remarks made above in regard to Bertalot are incorporated herein.

British Patent No. 530,342 teaches the use of flexible helical coils in roller journal bearings. In a roller bearing according to the British patent, the rollers 11 are coaxially arranged around an inner shaft or equivalent 12. See Fig. 1. The roller bearings are intended for use in aircraft shock absorbers and they are particularly suitable for use in the elbow joints of the V-linkages used to prevent rotation of shock absorber legs. See page 4, lines 63 to 66.

The roller journal bearings of the British patent are used for reasons of their lightness, which is important in aircraft

work. See page 4, lines 51 to 56. As described in the British patent, it is an important feature that the rollers tend to assume an oval shape under high loads, thus enlarging their area of contact with the races and so avoiding indentation of the races. See page 4, lines 56 to 62.

However, telescopic mechanisms for steering columns of motor vehicles do not have to take loads comparable to roller bearings in aircraft shock absorbers. Moreover, when developing parts for motor vehicles, lightness is not as important as in aircraft construction.

What is important for a telescopic mechanism for steering columns of motor vehicles is to ensure a clearance-free and symmetrical transfer of the steering torque from the internal element to the external element. The matter of clearance is, however, not mentioned in the British patent. In fact, when manufacturing a journal roller bearing, clearance can be avoided easily due to the rotational symmetry of the bearing cages. This is not the case with telescopic mechanisms, since precise flat linear races cannot be manufactured as easily and economically as rotationally symmetric bodies.

Therefore, it would not be obvious to use flexible helical coils as rollers for a telescopic mechanism for steering columns of motor vehicles.

Since the flexible rollers of the roller journal bearing according to the British patent are specially adopted to be used in aircraft construction, and since the requirements of a

telescopic mechanism for a steering column of a motor vehicle are completely different, and since the problems that arise when manufacturing a telescopic mechanism are different from those that arise when manufacturing a roller journal bear, it is submitted that the subject matter of the invention as a whole would not be obvious from Bertalot in view of the British patent.

In order to provide a combination of references, there must be some suggestion in the art, or some logical reason to do so. In this case, there is clearly no suggestion in the art. Further, for the reasons given above, there is no logical reason to do so. In fact, due to the different requirements and applications, it is submitted that there is an effective teaching away from using helical spring roll bodies for a telescopic mechanism.

Further, it will be appreciated that, in the present invention, as well as Bertalot, the axes of the roller or roll barrels are oriented transversely to the relative axial direction of movement between the internal and external elements. In the British patent, on the other hand, the coil spring rollers 11 of the British patent are arranged in the same axial direction as movable members formed by the inner tubular member 10 that forms the inner race and the outer tubular member 13 having an internal cylindrical surface 14 that forms the outer race. It is therefore clear that the inner and outer members rotate relative to each other, rather than move axially relative to each other. Therefore, coil spring rollers 11 in the British patent are

oriented perpendicular to the direction of the roll barrels of the present invention. As a result, they operate in a very different manner, and different forces are involved. Therefore, it is submitted that it would not be obvious to combine the coil spring rollers 11 of the British patent with the rollers of Bertalot. The British patent makes it clear that the external and internal races rotate relative to each other, rather than move axially in a telescoping relation. Specifically, the British patent is directed to a journal bearing, as claimed.

For this reason, it would not be obvious to combine Bertalot with the British patent, in view of the very different considerations of a telescoping mechanism and a journal bearing.

A new independent claim 21 has been added which is the same as claim 1, but which further recites the limitations of the internal element and external element being movable relative to each other in an axial direction, and the roll barrels being oriented substantially transverse to said axial direction of movement between the external element and internal element, in order to more clearly provide this differentiation.

Accordingly, it is respectfully submitted that the rejection of claims 2-4, 14, 15 and 17 under 35 U.S.C. §103(a), has been overcome.

Claims 6-8 and 20 were rejected under 35 U.S.C. §103(a) as being obvious from Bertalot in view of U.S. Patent No. 1,617,613 to Wells.

The remarks made above in regard to Bertalot are incorporated herein.

In Wells, the matter of avoiding clearance between the inner race, the rollers, and the outer race is also not mentioned. Only the necessary clearance between the cage and the other parts is addressed.

As stated above, the problems that arise when manufacturing a telescopic mechanism are different from those that arise when manufacturing a roller journal bearing. Therefore, the subject matter of the invention as a whole would not be obvious from Bertalot in view Wells.

It will be appreciated that Wells, like the cited British patent, is directed to a roller journal bearing in which the axes of the rollers are parallel to the rotational axis of the journal bearing, contrary to the present invention. See page 1, lines 101-102 of Wells. Thus, as discussed above in regard to the British patent, there would be no logical reason to use the rollers of Wells which are oriented parallel to the axial direction of the journal bearing in place of the rollers of Bertalot in which the axes of the rollers are oriented transversely to the relative axial moving direction between the internal and external telescoping members.

Accordingly, it is respectfully submitted that the rejection of claims 6-8 and 20 under 35 U.S.C. §103(a), has been overcome.

As for U.S. Patent No. 4,898,566 to Hakansson, similar



arguments apply as stated for Bertalot. There are no hollow elasticity bodies disclosed, and plate springs 8 are needed to avoid clearance, because the rollers 10 are not elastic.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

In the event that this Paper is late filed, and the necessary petition for extension of time is not filed concurrently herewith, please consider this as a Petition for the requisite extension of time, and to the extent not tendered by check attached hereto, authorization to charge the extension fee, or any other fee required in connection with this Paper, to Account No. 07-1524.

The Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 07-1524.

In view of the foregoing amendments and remarks, it is respectfully submitted that Claims 1-21 are allowable, and early and favorable consideration thereof is solicited.

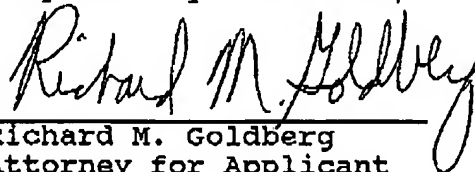
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